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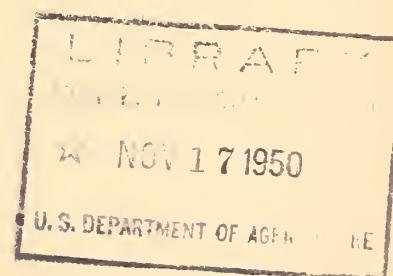
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COTTON PRODUCTION AND TRADE IN MOZAMBIQUE

by

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FOREWORD

Cotton production in Mozambique has quadrupled in the past decade. Though not an important factor in world markets, this production now accounts for about 70 percent of Portugal's total cotton imports, compared with 16 percent in 1940 and about 1 percent in 1930. This trend has been accompanied by a corresponding decrease in the importance of American cotton in Portuguese markets. In the mid-1930's the United States supplied more than half of Portugal's cotton imports...since 1942 we have supplied none.

This report summarizes observations made by P. K. Norris, agricultural economist, who conducted a first-hand study of Mozambique's cotton production and trade in the summer of 1950. Mr. Norris visited Mozambique while he was stationed at Cairo as cotton representative for this Office.

Possibilities for expanding foreign market outlets for a number of other agricultural commodities are being studied by this Office, and the results of such investigations are being presented in circulars and reports that may be obtained, free, from the Office of Foreign Agricultural Relations, United States Department of Agriculture, Washington 25, D. C.



Joseph A. Becker, Chief
International Commodities Branch

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The Portuguese Colony of Mozambique contains an area of some 300,000 square miles lying along the Indian Ocean in southeast Africa. The Governor General of the Colony is appointed by the Government of Portugal, and all administrative functions are in the hands of officers sent out from the mother country. Law and order are maintained by the army and a local police force under the direction of Portuguese officers. The Government exercises a strict control over imports, exports, and monetary matters. The city of Lourenco Marques is the capital and the most important port in the Colony.

POPULATION

The population of Mozambique is estimated at 5,000,000 and for the most part consists of tribesmen who live under primitive conditions much as they have for years. Aside from minor tribal affairs these people have little or no influence in the Government of the Colony. They are engaged largely in a type of agriculture that supplies the staple food crop as well as much of the agricultural exports of the Colony. For several years the Government has recruited large numbers of natives for work in the mines of Mozambique and in areas outside the Colony. The people who work outside the Colony are employed on an annual basis and as a rule bring considerable money into the Colony when they return from their year's work. However, they appear to have made very little use of this income in terms of improving the living conditions in the tribal villages. The natives engage primarily in subsistence farming and have shown little interest in producing for commerce. If, on a large scale, the native farmers can be impressed with a desire for commodities they do not now possess, they may ultimately produce a surplus to be exchanged for other commodities and articles.

The non-native population is estimated at about 600,000, of which approximately one-half are Europeans and the remainder are East Indian. These people live in the cities and towns along the coast and are engaged in trade and commerce or in the Government service. The most densely populated areas are the valleys of the numerous rivers and creeks and the narrow coastal plains. These areas are also the leading agricultural districts of the Colony.

TOPOGRAPHY AND SOIL

The topography of Mozambique is characterized by a narrow coastal plain, a central plateau ranging from 800 to 3,000 feet in elevation and a range of mountains along the western frontier reaching 3,000 to 5,000 feet in places. The coastal plain is transversed by numerous creeks and rivers which merge into wide estuaries before they reach the sea. Some of these estuaries form the harbors around which the coastal cities and towns are built.

The most productive soils are the deep clays and clay loams found in the river and creek bottoms. Much of the lowland is subject to overflow, but where the area is above flood levels the soils are productive. The central plateau is a rolling, hilly area drained by dozens of rivers and small creeks. The alluvial soils of the creek bottoms are reasonably fertile, but the soils of the upland are as a rule shallow, sandy, and of low fertility. When the vegetation is burned off, as is the native practice, these areas erode rapidly. For this reason, much of the cultivation is confined to the creek bottoms and the low level areas of the coastal plain. However, there are numerous small cultivated plots, ranging from one-fourth acre to as much as 3 or 4 acres scattered throughout the upland areas. After a year or two of cultivation these plots erode so badly that they are abandoned and in time revert to native vegetation. New plots are developed by burning off the vegetation and the process is repeated. Only an extensive supply of land in relation to population makes this type of cultivation possible. The upland areas are as a whole better suited to grazing than to cultivation of crops. The mountain areas are too

high and for the most part too steep for cultivation although the soil is reasonably fertile. These areas also erode rapidly when brought under cultivation.

CLIMATE

The climate of Mozambique is tropical. The seasons are defined by rainfall rather than by temperatures, although a cool season is associated with the wet season and the warm season with the dry season. Because of the Colony's length from north to south and its elevation from sea level to more than 5,000 feet, the rainfall varies widely from district to district. Annual rainfall averages about 35 inches, but during the past 10 years this has fluctuated from as little as 24 inches to more than 50 inches. However, there are certain areas where the rainfall is permanently light while in other areas it is always excessive. The wet or cool season extends from about the middle of November to the end of March and the dry season from April to the middle of November. As a rule, about 75 percent of the annual rainfall occurs during the wet season. The wettest month is February, and the driest month is August. During the dry season, which is also the season of high temperatures, much of the annual vegetation dies and the countryside shows the effects of the drought, but with the coming of the rain vegetation develops and the country becomes green again. During the wet season it often rains as much as 4 to 5 inches in a few hours. High humidity and fog are common along the coast, and in the river bottoms during the cool or wet season. This often has an unfavorable influence on the growing crop of the area.

TRANSPORTATION

The internal transportation is limited. There is slightly more than a thousand miles of railroad in the Colony, but on the whole railroads have had little influence in the development of agriculture. The most important lines connect the sea ports with the Union of South Africa and the British Territories and appear to be of more service to these areas than to the interior of the Colony. The seaport terminals of these roads have become the outlets for much of the heavy freight originating outside the Colony. An important item in the Colonial budget is the revenue derived from the railroad service for these areas.

The coastal shipping service, though not extensive, is adequate. The Colony is served by a number of European and American steamship lines. The dock and loading facilities, however, in some of the ports are small and inadequate.

There are several hundred miles of dirt roads feeding into the towns and cities along the railroads and on the coast. Like the railroads they do not connect the chief coastal towns. There is but little paved road surface throughout the Colony.

For thousands of natives the only form of transportation is the pack carried on foot along the paths and trails. Much of the cotton grown in the Colony leaves the native village in packs and is carried along a trail for miles to a buying station or gin. There are thousands of miles of these trails through the forest, and they form an important part of the internal transportation system.

COTTON POLICY

The development of its colonial areas as a source of cotton for the home industry is an acknowledged policy of the Government of Portugal. The organization through which this policy is operated is the Junta de Exportacao do Algodao Colonial or the "Board." This organization maintains its headquarters in Lisbon. Its members represent the Government, the spinners, and the import merchants of Portugal and the exporters of the colonies. In Mozambique the expansion program is administered by the Delegacao de Mocambique (Mozambique Branch) and the Centro de Investigacao Cientifico Algodoeira (Scientific Cotton Research Center).

The Branch Office has charge of all promotion and regulatory work while the research phases are in charge of the Research Center.

For the purpose of administration the cotton growing area is divided among 11 individuals or corporations known as "concessioners."

Each concessioner is licensed to operate only in an assigned area. It buys, gins, and sells the cotton grown in its zone under the rules and regulations fixed by the Board.

There has been some criticism of this system but on the whole it seems to have worked very well. The Board has such broad powers that it can and does control the operations of both the native and the concessioner.

COTTON PRODUCTION, ACREAGE, AND YIELD

Although cotton has been grown in Mozambique for many years, it was not an important crop prior to World War I. During that war and the years immediately following, cotton prices were relatively higher than prices of food crops produced in the Colony. Cotton production during this period was characterized by a plantation type of cultivation under the direction of European owners or operators. Portuguese spinners who were interested in a colonial supply of raw material joined with the home and colonial Governments in an effort to expand production. Several large European operated plantations turned from sugar and other food crops to cotton. In the early 1920's a sharp decline in the price of cotton occurred, and as a result the large plantation owners suffered heavy losses. Many of them failed or returned to the production of food crops. Low prices also adversely affected the native cotton growers, but because they could not turn to other crops with the same advantage as could the plantation owner they continued to grow some cotton. By 1926 native production had also declined to a point where the Government felt some action was necessary if the crop were to be maintained. Therefore, a Government regulation fixing the prices of seed cotton and requiring native farmers to plant a part of their cultivated land to cotton was issued. Free entry of supplies needed in cotton production and handling, along with the special low freight rate on the local railroads, was also used as an inducement to both growers and buyers. Despite the efforts of the Government and the spinners, production remained at a low level for several years. Between 1931 and the outbreak of World War II the crops made some recovery and gradually assumed an important place in the native agriculture of the Colony. The expansion during and since the war--largely a native development--has made cotton the chief agricultural export of the Colony. Mozambique and the Portuguese Colony of Angola in West Africa are now supplying almost the entire raw cotton requirements of the Portuguese spinners. (See table 1.)

The cotton area at the beginning of the war was slightly in excess of 473,000 acres, but 3 years later in 1942-43 it reached an all-time record of more than 850,000 acres. Since that date there has been some decline, but the area has never fallen below 500,000 acres. The area in 1948-49, the last year for which data are available, was slightly above 634,000 acres. (See table 2.)

On the whole, yields per acre are not high when compared with yields in other cotton growing countries of the world. The average annual yield since 1939-40 has ranged from a low of 30 pounds in that season to 95 pounds in 1948-49. It seems that the annual fluctuation in yields has influenced production to a greater extent than has the annual fluctuation in the area planted. The seasons of 1941-42 and 1942-43 are examples of this. In 1941-42 the planted area was a little more than 564,000 acres, but yields averaged 87 pounds per acre, and the production was a little above 102,000 bales. During the following season, when the planted acreage reached an all-time record of 850,000 acres, yields were only 50 pounds per acre, and the annual crop was 88,982 bales or 13,000 bales less than during the 1941-42 season despite the fact that 286,000 acres more were planted. Yields per acre also seem to influence the area planted the following year. During years in which yields are relatively low, the natives become discouraged and plant little or no cotton the following season, but following years of relatively high yields they increase the planted area. Since yields are not uniform over the entire Colony, the full influence of this fluctuation on the individual farmer cannot be shown by country-wide averages, but there is little doubt that natives who obtain good yields plant cotton year after year, while those who obtain low yields drop out as cotton growers after a year or two. It often requires some Government action to get them back into production. Average yields during the past 5 years have been relatively favorable and acreage and production have been at high levels. (See table 2.)

FACTORS INFLUENCING YIELDS

The low average yields are due largely to unfavorable climatic conditions during the growing season, resulting in insect and disease damage, low soil fertility, and poor cultural practices. Over much of the cotton area rainfall ranges from 25 to 50 inches during the growing season. The relative humidity and temperature are high. In the better soil areas where yields normally should be high the relative humidity and the day temperature often reach 90 simultaneously. Fog is also common over much of this area during the growing season. Such climatic conditions are

TABLE 1.--Portugal: Imports of Cotton by countries of origin, 1921-1949.

Calendar Years	U. S.	Brazil	Egypt	India	Angola	Mozambique	Others	Total
	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales	1,000 bales
1921	41	17	2	(²)	1	(¹)	5	66
1922	21	29	(¹)	(²)	3	(¹)	11	64
1923	38	27	(¹)	(²)	1	(¹)	8	74
1924	24	11	1	(²)	3	(¹)	21	60
1925	21	10	(¹)	(²)	2	1	33	67
1926	31	8	(¹)	(²)	4	2	31	76
1927	39	7	1	(²)	3	1	26	77
1928	43	6	(¹)	(²)	2	1	25	77
1929	50	11	(¹)	(²)	3	1	10	75
1930	55	14	(¹)	1	3	1	9	83
1931	46	10	(¹)	1	3	1	7	68
1932	77	1	1	1	3	5	11	99
1933	76	1	3	1	4	7	8	100
1934	51	25	3	3	3	9	6	100
1935	59	20	5	4	5	8	7	108
1936	44	11	6	4	10	15	5	95
1937	36	31	9	8	14	38	3	139
1938	40	28	8	3	14	35	0	128
1939	8	19	9	2	20	30	0	88
1940	18	41	10	3	18	21	0	111
1941	16	41	3	1	22	23	11	117
1942	0	12	6	1	21	65	0	106
1943	0	0	4	(¹)	18	61	0	83
1944	0	15	6	(¹)	28	104	1	154
1945	0	8	7	(¹)	12	79	3	109
1946	0	2	6	(¹)	40	134	0	182
1947	0	13	5	(¹)	22	78	1	119
1948	0	11	4	1	20	114	1	151
³ 1949	0	29	6	1	17	118	2	173

⁽¹⁾ Less than 500 bales.⁽²⁾ If any, included in "other countries".⁽³⁾ Preliminary.

TABLE 2.--Mozambique: Cotton area, production and yield, 1939-40, 1948-49

Year	Areas	Production	Yield per Acre
(Aug. 1 to July 31)	(Acres)	(Bales 480 lbs. net)	(Pounds)
1939-1940	473,592	29,745	30
1940-1941	612,032	74,265	58
1941-1942	564,149	102,174	87
1942-1943	850,656	88,982	50
1943-1944	660,014	92,912	68
1944-1945	732,592	79,301	52
1945-1946	574,398	91,372	76
1946-1947	609,475	109,090	86
1947-1948	577,609	109,142	91
1948-1949	634,145	125,657	95

Source - Junta de Exportacao do Algodao Colonial, Delegacao de Mocambique.

most favorable for the development of all kinds of insects and diseases. The most common and destructive insects are the jassid, the pink bollworm, the sudan bollworm, and several kinds of cotton stainers. The common diseases are anthracnose, angular leaf spot, and the various forms of bacterial blight. Some progress has been made in the control of jassid damage by the development of resistant varieties but this has not been fully successful. The value of insecticides and germicides is known to the agricultural officers, but the problem of extending the use of these controls is not a simple one. Because of the hundreds of small plots scattered throughout the Colony it is almost impossible to give the necessary supervision.

Low soil fertility is also a factor in low average yields. While some of the most fertile soils are planted to cotton, a great deal of the crop is grown on the thin sandy upland soils of the central plateau. If the crops were planted only on the better soils average yields might be expected to be considerably larger, but under present cultural methods this is not possible. Usually a small plot is cleared for cotton by burning during the dry season and, as a rule, an area is selected that can be burned over easily. Since the better soils retain more moisture the vegetation on them remains green longer, and such areas are usually passed by. This tends to put cotton on the poor sandy soils where moisture is often short. In most cases a plot receives very little preparation or cultivation before the seed is planted. The seed is dropped by hand, and weeds are kept down or under control by the use of a crude type of hand hoe. The varieties grown are to a degree resistant to jassid damage but are not high yielding. There are a number of known varieties that yield much better than the present varieties, but the presence of the jassid insect prevents their use. Some progress has been made in the development of jassid resistant varieties that will give higher yields, longer and more uniform staple, and a higher gin turn-out, but the work is not complete. This is one of the outstanding problems of the agricultural research workers of the Colony.

The planting date has been studied by the research workers, and it has been found that, by planting in November instead of January as is the common practice, yields can be increased sharply. The early planting seems to yield better because more of the growing season occurs during periods of ample rainfall. Dry weather often cuts the yield when the crop is planted late. In a number of cases under experimental conditions yields have been doubled just by planting in November rather than at a later date.

HANDLING AND MARKETING

Native growers sell cotton in the seed. Each designated ginner has a number of buying or receiving stations scattered throughout the zone in which he operates. The native carries small lots of seed cotton long distances, often taking two days or more to make a round trip from village to market. Trucks pick up the cotton at the buying station and deliver it to the gin.

Some effort is made to class the seed cotton before it is ginned, but in many cases the crop is divided into only two grades, clean and trashy cotton.

Prices are not high but since they are fixed by Government regulations they are stable. During the past 10 years the price paid to growers has been about 7 to 9 cents per pound on the basis of lint cotton. Exports have been sold at what appears to be below world prices. An object of the present Government policy seems to be to assure a stable price to the native grower and, at the same time, to supply cotton to the Portuguese textile industry at less than world prices.

There are about 30 cotton gins in operation in the Colony. Most of them are small and out of date. In recent years a few new American gins have been built. These plants are a real improvement; although they may not be much larger than some of the older ones, they are equipped with modern machinery and not only do a better job but require much less labor to operate.

The presses in the new plants put up a bale of about 450 pounds, with a density of about 28 pounds per cubic foot. The old presses are far from uniform but for the most part turn out bales that range from 100 to 250 pounds in weight and 15 to 20 pounds in density.

After the cotton is ginned it is classed by the Cotton Board and moved to port for export. During the war, because of shipping difficulties, cotton accumulated at the ports, but under present conditions it moves into export about as rapidly as it is ginned. All exports are to Portugal.

VARIETIES AND SEED DISTRIBUTION

All the cotton grown in Mozambique is American upland. The present varieties are selections from Uganda stock made by the Union of South Africa Experiment Station located at Barberton. These selections have the advantage of being somewhat resistant to jassid and are reasonably early. They have a staple length of from 7/8 to 1-1/16 inches and a gin turn-out of 31 to 33 percent.

Cotton is planted in the southern part of the Colony from November to January or later. Research indicates that yields from the early planting are as a rule higher. In the northern areas the crop is planted from about December to January. Picking runs from May to July in the south and from June to September in the north.

The concessioner is required to supply free seed to all growers. Until a few years ago this was a simple operation, requiring little or no time. The seed was made available at a number of points throughout the cotton area. Native farmers were free to take as much as they could use. In recent years the seed has become more valuable and the concessioners no longer dump it at distribution points and allow the native to take as much as he wants. A check is now kept on the distribution of all planting seed.

LARGE SCALE PRODUCTION

The development of large scale production is receiving some attention and study by the agriculture workers of the Colony. At present only a small percentage of the crop is grown under what might be called plantation conditions. Studies in the use of mechanical equipment including a cotton picker are being conducted under the direction of men who understand the problems and who are proceeding slowly.

One of the real problems in the use of machinery by the native is the small scattered plots. It appears to be the policy of the Government to encourage the concentration of native production in the river valleys and better soil areas. If it is shown that the native farmers can be converted to farm machinery, the next step would be to bring them into a kind of "block" where plowing, planting, and cultivation might be done by power tools. There are large areas where such arrangements could be made if mechanization proves successful.

TEXTILE INDUSTRY

A start has been made in the development of a cotton textile industry in Mozambique. Two small plants are now in operation or under construction. The industry may expand until it will supply a substantial part of the local demand for textiles, but at present it is not an important factor in the consumption of cotton or the economy of the Colony.

The present consumption is estimated at about 14,000 bales of cotton a year, of which about one-half is locally grown. The long staples required are now imported.

It is only in recent years that the Government policy has favored a local textile industry. Formerly the trade in cotton textiles was reserved for the Portuguese spinners. While it is too early to predict the future policy of the Government, it would appear that some increase in the local industry will be permitted. Some increased development of hydroelectric power is being considered. If this becomes a reality the textile industry will no doubt increase. Much will depend upon Government policy regarding a general program of industrial development in the Colony.

OUTLOOK

For many years the Government and the spinners of Portugal have been promoting cotton production in the colonies. At the present some 80 to 90 percent of the Portuguese cotton requirements are produced in the colonies. No other European country having cotton growing colonies has been able to secure so high a percent of its domestic requirements from its colonial possessions.

Because of the wide range in the types of cotton required the colonies may never be able to produce one hundred percent of the cotton consumed in Portugal, but this should not retard the expansion of production in the colonies. At present there is a growing textile industry in the

colonies which may increase to a point where a considerable part of the crop would be consumed locally. This, with a normal increase in consumption in Portugal, would indicate room for some expansion without depending upon an export outlet. There is little indication, however, that Mozambique will in the near future expand production to a point where exports will become a factor in world markets.

From the standpoint of available land there is no question that production can be expanded. And, if the Government is successful in a program of concentrating cotton in the areas where it is most favorably produced, yields will increase as well as the total crop. Under the system of agriculture now followed by the natives, cotton is only a part, and in most cases a small part, of their total operations. The possibilities of increasing production are limited by a number of other factors such as insects and diseases, lack of interest among farmers, and transportation.

Insects and diseases are a major problem of the agricultural research worker, and no satisfactory solution has been developed. The climate of Mozambique is particularly favorable to the development of pests and diseases and the native worker is almost defenseless against them with the result that yields are often very low. Yields must be increased if large numbers of natives are to be induced to grow cotton year after year.

Because of long distances and the primitive system of transportation, expansion of production will take place slowly and be limited in extent.

If and when an incentive is provided for more natives to follow a more productive type of agriculture, cotton will no doubt find a place in such a cropping system. It is perhaps the most ideal cash crop that can be grown by the native population. The development of an expanded production for use in the Colony and in Portugal is in keeping with the present Government policy, but there is little indication that Mozambique can or will soon become a permanent producer of cotton for world markets.

